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REMARKS

Favorable reconsideration of this application in view of the remarks to follow and allowance of the claims of the present application are respectfully requested.

Applicants have cancelled Claim 2 and amended Claims 1, 3 and 4. Support for said amendments can be found in the specification at Pages 1, lines 4-7; Page 5, lines 20-33; Page 6, line 10; Page 8, lines 29, 30; and Pages 18-24, Examples 5-7. No new matter has been added.

Claims 1, 2, 4, 12-18, 24, and 29 are rejected under 35 U.S.C. §102(b) as allegedly anticipated by U.S. patent No. 6,146,856 to Heikkila ('856).

It is axiomatic that anticipation under §102 requires that the prior art reference disclose each and every element of the claim to which it is applied. *In re King*, 801 F.2d, 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1996). Thus, there must be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: absence from the applied reference of any claimed element negates anticipation. *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

The '856 reference relates to a process for the simultaneous production of converted and non-converted sugar and/or non-sugar products. The '856 reference discloses the use of cation ion exchange chromatography in recovering isomaltulose, trehalulose and betaine (Column 8, lines 4-6; Columns 7-9, Examples 3 and 4), and hydrogenation of isomaltulose and trehalulose (Column 10-11, Examples 6 and 7). The '856 reference further discloses that a weakly basic anion exchange resin in OH⁻ form is used as one of the resins for the ion exchange,

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and that removal of ions is confirmed by the results of Table 6 showing the content of salts (conductivity) is significantly lower after the ion exchange than before the ion exchange (Column 11).

The '856 reference fails to disclose a method for separating sugars which comprises at least one step in which a weakly basic anion exchange resin is used for chromatographic separation as presently claimed. Therefore, Claims 1, 2, 4, 12-18, 24, and 29 are not anticipated by the '856 reference.

Claims 1-18, 20-22, and 24-32 are rejected under §103(a) as allegedly obvious over the '856 reference. The Examiner alleges that it would have been obvious to optimize the steps of the '856 reference to enhance separation.

Applicants respectfully submit that the Examiner fails to establish a *prima facie* case of obviousness as discussed below.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the cited references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the reference, not based on applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Referring to the above, the '856 reference teaches the use of a cation exchange resin, not a weakly basic anion exchange resin, for chromatographic separation of sugars. A weakly basic anion exchange resin is disclosed in the '856 reference for the ion exchange of an isomaltose/thehalulose containing product to provide a deionized (ion-exchange) disaccharide

(isomaltulose) product, i.e., a product from which ions have been essentially removed rather than for sugar separation. Further, it is known to a person having ordinary skill in the art that there are fundamental differences between the principles of cation ion exchange and anion ion exchange chromatography (Chapter 13, Ion Exchange, NALCO Water Handbook, 2nd Edition, 1998, McGraw-Hill). Thus, the '856 reference does not teach or suggest the use of a weakly basic anion in the separation of sugar.

The §103 rejection also fails because the '856 reference discloses that the chromatographic separation of isomaltulose/trehalulose and betaine or invert sugar may be performed with the same type of process and equipment as that used in the prior art for separating sucrose and betaine or invert sugar, respectively (Column 5, lines 19-23).

There is no motivation provided in the '856 reference, or otherwise of record, to make the modification to use of a weakly basic anion in the separation of sugar. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Vaeck, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

Accordingly, Claims 1-18, 20-22, and 24-32 are not rendered obvious by the '856 reference.

The rejection under 35 U.S.C. §103 has been obviated; therefore reconsideration and withdrawal thereof is respectfully requested.

Claim 3 is rejected under §103(a) as allegedly obvious over the '856 reference in view of either U.S. patent No. 3,982,956 to Schoenrock ('956) or U.S. patent No. 6,224,683 to Tanikawa ('683).

Claim 3 is directed to the use of a weakly acid cation exchange resin and a weakly basic anion exchange resin in the chromatographic separation of sugars, sugar alcohols and polyols. The examiner expressly conceded that Claim 3 recites the use of a weakly acid cation exchange resin and thus differs from the disclosure of the '856 reference, but attempted to remedy this deficiency of the '856 reference by combining the '956 reference and the '683 reference.

The '956 reference discloses the use of a weakly basic anion exchanger in decolorization of impure sugar juice and the use of a weak acid cation exchange resin prior to a weak base anion exchange resin in removing undesirable cations to reduce the ICUMSA color units (Column 1, lines 47-56; Column 2, line 65-Column 3, line 20). The reference reports the ability of a weakly basic anion exchange to remove the major floc and color components (Column 1, lines 62-65).

The '683 reference discloses the use of a weak acid cation exchange resin in softening and demineralizing a beet sugar solution (Column 1, lines 46-51).

The '956 reference and the '683 reference relate to decolorization and demineralization of sugar, respectively, wherein non sugar components were removed. The '856 reference discloses the use of cation ion exchange chromatographic in the separation of sugar. There is no motivation for a person of ordinary skilled in the art to combine the teachings of either the '956 reference or the '683 reference with the teachings of the '856 reference. Therefore, neither the '956 reference nor the '683 reference remedy the above described deficiency of the '856 reference and such combination does not support a prima facie case of obviousness against Claim 3 of the present application.

Claim 5 is rejected under §103(a) as allegedly obvious over the '856 reference in view of U.S. patent No. 4,718,946 to Fries ('946).

Claim 5 is directed to the method of Claim 1 wherein the resin used is an acrylic-based resin. The examiner expressly conceded that Claim 5 recites that the weakly acid anion exchange resin is an acrylic based resin, thus differing from the disclosure of the '856 reference, but attempted to remedy this deficiency by combining the '946 reference.

The '946 reference discloses the use of an acrylic anion exchange resin to purify sugar solutions and more specifically, to reduce haze in treating sugar solutions (Column 1, line 67-column 2, line 12).

Because, inter alia, the '946 reference relates to a purification process rather than a separation process, there is no motivation for a person ordinarily skilled in the art to combine the teachings of the '946 reference with the teachings of the '856 reference. Therefore, the '956 reference does not remedy the above described deficiency of the '856 reference and does not support a prima facie case of obviousness with respect to claim 5 of the present application.

Claims 6-11 are rejected under §103(a) as allegedly obvious over the '856 reference in view of either U.S. patent No. 4,145,486 to Haag ('486) or U.S. patent No. 5,863,438 to Katzakian ('438). Claim 11 is further rejected under §103(a) as allegedly obvious over the '856 reference in view of U.S. patent No. 4,051,221 to Pannekeet ('221).

Claims 6-11 are directed to the choices of the resins and the crosslinking of said resins that are used in the method of Claim 1. The Examiner expressly conceded that Claims 6-11 recite the use of styrene crosslinked with divinylbenzene and isoprene, thus differing from the disclosure of the '856 reference, but attempted to remedy this deficiency by adding the '486 reference and the '438 reference.

The '486 reference discloses that styrene-divinylbenzene is a desired resin with which to make a weak base anion exchange resin (Column 5, lines 32-43).

The '438 reference discloses that styrene-divinylbenzene with primary or secondary amines are improved weakly basic anion exchange resins (Column 6, line 66-Column 7, line 14).

The '221 reference discloses that isoprene is a known monomer for crosslinking weakly basic anion exchangers (Column 2, 3-39).

Because the '856 discloses the use of a cation exchange resin while the '486, '438, and '221 references relate to different aspects of weakly basic anion exchange resins, there is no motivation for a person of ordinary skill in the art to combine the teachings of the '946 reference with the teachings of the '856 reference. Therefore neither the '486 reference, nor the '438 reference, nor the '221 reference remedy the above described deficiency of the '856 reference. Moreover, such teachings do not support a prima facie case of obviousness respecting claims 6-11 of the present application.

Claims 20-22 and 25 are rejected under §103(a) as allegedly obvious over the '856 reference in view of U.S. patent No. 5,637,225 to Heikkila ('225). Claims 26-28 are rejected under §103(a) as allegedly obvious over the '856 reference in view of U.S. patent No. 5,730,877 to Heikkila ('877). Claim 27 is further rejected under §103(a) as allegedly obvious over the '856 reference in view of U.S. patent No. 5,795,398 to Hyoky ('398).

Claims 20-22, 25-28 are directed to the separation products that are obtained from the method of Claim 1.

The '225 reference discloses a method for the fractionation of sulphate cooking liquor by a moving bed system.

The '877 reference discloses a method for fractionating a solution of a chromatographic simulated moving bed method in which the liquid flow is effected in a system comprising at least two sectional beds in different ionic forms.

The '398 reference discloses a method for separating sucrose and related components by a continuous or sequential chromatographic simulated moving bed process to yield a sucrose enriched fraction.

The examiner expressly conceded that Claims 20-22, 25-28 recite separating pentose, hexose, xylitol, rhamnose, maltose, inositol, and glycerol and thus differ from the disclosure of the '856 reference, but attempted to remedy this deficiency of the '856 reference by citing the '225, '877, and '398 references.

Because the cited three patent references disclose the desire to separate different kinds of sugars while the '856 reference relates to separation of converted and non-converted sugar and/or non-sugar products, there is no motivation for a person of ordinary skill in the art to combine the teachings of the cited references with the teachings of the '856 reference.

Even if a person of ordinary skill in the art would combine the '856 reference and other cited references, the combined teaching, at best, teaches the use of cation exchange chromatography in the separation of different kinds of sugars and thus does not teach or remotely suggest the use of weakly basic anion chromatography in the separation of sugars. Therefore, neither the '225 reference, nor the '877 reference, nor the '398 reference remedy the above described deficiency of the '856.

Claims 30-32 are rejected under §103(a) as allegedly obvious over the '856 reference in view of the '877 reference.

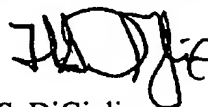
The '877 reference discloses a method for fractionating a solution of a chromatographic simulated moving bed.

The combined teachings of the '856 reference and the '877 reference, at best, teach the use of a moving bed with a cation exchange column in the separation of converted and non-converted sugar and/or non-sugar products and thus does not teach, suggest or motivate one ordinarily skilled in the art to use a weakly basic anion exchange in the separation of sugar.

Therefore, the §103(a) rejections are obviated and withdrawal thereof is respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present application is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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